

Claims

- [c1] 1.A method for acquiring cardiac information from a patient having a pacer for pacing a heart rhythm, an abnormal EKG, or an abnormal heartbeat, the method comprising:
- placing a signal injection device proximate the pacer of the patient and injecting a signal across a skin barrier of the patient toward the pacer;
- in response to the signal received at the pacer, pacing the patient's heart in a fixed asynchronous pacing mode;
- and
- acquiring cardiac information relating to the patient's fixed asynchronously paced heart.
- [c2] 2.The method of Claim 1, further comprising:
- acquiring a cardiac image of the patient's fixed asynchronously paced heart.
- [c3] 3.The method of Claim 1, wherein:
- the signal is a magnetic signal, a wireless signal, an x-ray signal, a microwave signal, an infrared signal, or any combination of signals comprising at least one of the foregoing; and
- the signal is at least one of a fixed signal and a pulsed

signal.

- [c4] 4.The method of Claim 1, wherein the signal injection device is a magnetic signal injection device comprising at least one of a fixed magnet and an electromagnet.
- [c5] 5.The method of Claim 1, further comprising:
in response to the signal received at the pacer, activating a switch at the pacer for pacing the patient in a fixed asynchronous pacing mode.
- [c6] 6.The method of Claim 4, wherein the magnetic signal injection device is adapted to produce a magnetic signal having a signal strength at the pacer equal to or greater than about 90 Gauss.
- [c7] 7.The method of Claim 6, wherein the magnetic signal injection device produces a magnetic signal having a signal strength at the pacer equal to or greater than about 90 Gauss when placed at a distance equal to or less than about 2 inches from the pacer.
- [c8] 8.The method of Claim 4, wherein the magnetic signal injection device has an outside dimension equal to or greater than an outside dimension of the pacer.
- [c9] 9.The method of Claim 1, wherein the fixed asynchronous pacing mode includes a ventricular, an atrial,

or a dual chamber asynchronous pacing mode.

[c10] 10.A method for acquiring a cardiac image from a patient having a pacer for pacing a heart rhythm, an abnormal EKG, or an abnormal heartbeat, the method comprising:

receiving a gated electrocardiogram signal having local maxima and minima values and trigger points;

determining for a period of time the time between each trigger point and the local maxima or minima associated therewith;

in response to the trigger point occurring at the associated local maxima or minima, calculating a zero time differential for a corrected trigger for gating;

in response to the trigger point occurring prior to the associated local maxima or minima, calculating a time delay for the corrected trigger;

in response to the trigger point occurring after the associated local maxima or minima, calculating a time advancement for the corrected trigger;

sending the corrected trigger to a cardiac image acquisition device for gating, wherein the gating is substantially synchronized with the local maxima or minima of the gated electrocardiogram signal;

placing a signal injection device proximate the pacer of the patient and injecting a signal across a skin barrier of

the patient toward the pacer;
in response to the signal received at the pacer, pacing
the patient's heart in a fixed asynchronous pacing mode;
and
acquiring a cardiac image of the patient's fixed asyn-
chronously paced heart.

[c11] 11.The method of Claim 10, wherein the signal injection
device is a magnetic signal injection device comprising at
least one of a fixed magnet and an electromagnet.

[c12] 12.The method of Claim 11, further comprising:
in response to the magnetic signal received at the pacer,
activating a switch at the pacer for pacing the patient in
a fixed asynchronous pacing mode.

[c13] 13.The method of Claim 11, wherein the magnetic signal
injection device is adapted to produce a magnetic signal
having a signal strength at the pacer equal to or greater
than about 90 Gauss when placed at a distance equal to
or less than about 2 inches from the pacer.

[c14] 14.The method of Claim 11, wherein the magnetic signal
injection device has an outside dimension equal to or
greater than an outside dimension of the pacer.

[c15] 15.The method of Claim 10, wherein the fixed asyn-
chronous pacing mode includes a ventricular, an atrial,

or a dual chamber asynchronous pacing mode.

- [c16] 16. An apparatus having electrocardiogram-gated acquisition and cardiac imaging capabilities for use with a patient having a pacer, the apparatus comprising:
- an electrocardiograph;
 - a cardiac scanner in signal communication with the electrocardiograph;
 - an interface board in signal communication intermediate the electrocardiograph and the cardiac scanner; and
 - a storage medium, readable by a processing circuit, storing instructions for execution by the processing circuit for:
 - receiving from the electrocardiograph a gated electrocardiogram signal having local maxima and minima values and trigger points;
 - determining for a period of time the time between each trigger point and the local maxima or minima associated therewith;
 - in response to the trigger point occurring at the associated local maxima or minima, calculating a zero time differential for a corrected trigger for gating; and
 - in response to the trigger point occurring prior to the associated local maxima or minima, calculating a time delay for the corrected trigger;
 - in response to the trigger point occurring after the asso-

ciated local maxima or minima, calculating a time advancement for the corrected trigger;
sending the corrected trigger to a cardiac image acquisition device for gating, wherein the gating is substantially synchronized with the local maxima or minima of the electrocardiogram signal;
wherein the patient is responsive to a signal injection device placed proximate the pacer of the patient, the signal injection device being adapted to inject a signal across a skin barrier of the patient toward the pacer;
wherein in response to the signal being received at the pacer, the patient's heart is paced in a fixed asynchronous pacing mode; and
acquiring a cardiac image at the cardiac image acquisition device of the patient's fixed asynchronously paced heart.

[c17] 17.The apparatus of Claim 16, wherein the signal injection device is a magnetic signal injection device comprising at least one of a fixed magnet and an electromagnet.

[c18] 18.The apparatus of Claim 17, wherein the magnetic signal injection device is adapted to produce a magnetic signal having a signal strength at the pacer equal to or greater than about 90 Gauss when placed at a distance equal to or less than about 2 inches from the pacer.

[c19] 19. The apparatus of Claim 16, wherein the fixed asynchronous pacing mode includes a ventricular, an atrial, or a dual chamber asynchronous pacing mode.